



App. No. 10/728,442

Amdt. dated April 27, 2005

Reply to Office Action of October 27, 2004

PATENT

Amendments to the Claims:

Please cancel claims 1-31 and add new claims 32-81. This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1 1-31 (canceled)

1 32 (new): A mass spectrometry probe comprising:

2 (a) a sample presenting surface, wherein the sample presenting surface is a
3 surface of the probe;

4 (b) energy absorbing molecules immobilized by chemical bonding to the
5 sample presenting surface; and

6 (c) an affinity reagent immobilized by chemical bonding to the sample
7 presenting surface, wherein the energy absorbing molecules are different
8 from the affinity reagent.

1 33 (new): The probe of claim 32, wherein the sample presenting surface does not
2 have additional matrix molecules.

1 34 (new): The probe of claim 32, wherein the probe comprises metal.

1 35 (new): The probe of claim 32, wherein the energy absorbing molecules are
2 covalently bound to the sample presenting surface.

1 36 (new): The probe of claim 32, wherein the energy absorbing molecules and
2 affinity reagent are arranged on the sample presenting surface in a predetermined array.

1 37 (new): The probe of claim 32, wherein the energy absorbing molecules are
2 selected from the group consisting of dimethoxy hydroxycinnamic acid, cinnamamide, cinnamyl
3 bromide, dihydroxybenzoic acid, and cyanohydroxycinnamic acid.

1 38. (new): The probe of claim 32, wherein the affinity reagent is covalently
2 bound to the sample presenting surface.

1 39. (new): The probe of claim 32, wherein the affinity reagent is selected from
2 the group consisting of a metal ion, a protein, a peptide, a nucleic acid and a dye.

1 40. (new): The probe of claim 39, wherein the affinity reagent comprises a metal
2 ion.

1 41. (new): The probe of claim 40, wherein the metal ion is selected from copper
2 or iron.

1 42. (new): The probe of claim 39, wherein the affinity reagent comprises a
2 protein or peptide.

1 43 (new): The probe of claim 42, wherein the protein or peptide is an
2 immunoglobulin.

1 44 (new): The probe of claim 39, wherein the affinity reagent comprises a
2 nucleic acid.

1 45 (new): The probe of claim 44, wherein the nucleic acid is DNA.

1 46 (new): The probe of claim 32, wherein the analyte comprises a protein.

1 47 (new): The probe of claim 32, wherein the analyte comprises a nucleic acid.

1 48 (new): The probe of claim 32, wherein the analyte is bound to the affinity
2 reagent.

1 49 (new): A method for detecting an analyte comprising:

- 2 (a) capturing an analyte on a sample presenting surface of a mass
3 spectrometry probe, wherein the sample presenting surface is a surface of
4 the probe, wherein the probe comprises (i) energy absorbing molecules
5 immobilized by chemical bonding to the sample presenting surface, (ii) an
6 affinity reagent immobilized by chemical bonding to the sample
7 presenting surface, wherein the energy absorbing molecules are different
8 from the affinity reagent, wherein the analyte is not dispersed in a matrix
9 crystalline structure, but is presented within, on or above the energy
10 absorbing molecules; and
11 (b) detecting the captured analyte by laser desorption/ionization mass
12 spectrometry.

1 50. The method of claim 49, wherein additional matrix molecules are not
2 added.

1 51 (new): The method of claim 49, wherein the energy absorbing molecules are
2 covalently bound to the sample presenting surface.

1 52 (new): The method of claim 49, wherein the energy absorbing molecules and
2 affinity reagent are arranged on the sample presenting surface in a predetermined array.

1 53 (new): The method claim 49, wherein the energy absorbing molecules are
2 selected from the group consisting of dimethoxy hydroxycinnamic acid, cinnamamide, cinnamyl
3 bromide, dihydroxybenzoic acid, and cyanohydroxycinnamic acid.

1 54. (new): The method of claim 49, wherein the affinity reagent is covalently
2 bound to the sample presenting surface.

1 55. (new): The method of claim 49, wherein the affinity reagent is selected from
2 the group consisting of a metal ion, a protein, a peptide, a nucleic acid and a dye.

1 56. (new): The method of claim 55, wherein the affinity reagent comprises a
2 metal ion selected from copper or iron.

1 57. (new): The method of claim 55, wherein the affinity reagent comprises an
2 immunoglobulin.

1 58 (new): The method of claim 55, wherein the affinity reagent comprises DNA.

1 59 (new): The method of claim 49, wherein the sample is selected from the
2 group consisting of blood, tears, urine, saliva, gastrointestinal fluids, spinal fluid, amniotic fluid,
3 bone marrow, bacteria, viruses, cells in culture, biopsy tissue, plant tissue or fluids and insect
4 tissue or fluids.

1 60 (new): The method of claim 49, wherein the analyte comprises a protein.

1 61 (new): The method of claim 49, wherein the analyte comprises a nucleic acid.

1 62 (new): The method of claim 61, wherein the nucleic acid is DNA.

1 63 (new): A mass spectrometry apparatus comprising:

2 (a) a probe comprising:

3 i. a sample presenting surface;

4 ii. energy absorbing molecules immobilized by chemical bonding to
5 the sample presenting surface;

- 6 iii. an affinity reagent capable of binding an analyte immobilized by
7 chemical bonding to the sample presenting surface; and
8 iv. an analyte that is not dispersed in a matrix crystalline structure, but
9 is presented within, on or above the energy absorbing molecules,
10 wherein the energy absorbing molecules are different from the
11 affinity reagent;
12 (b) an energy source that directs laser energy to the sample presenting surface
13 for desorbing and ionizing the analyte;
14 (c) a detector that detects the desorbed, ionized analyte
15 (d) a spectrometer tube into which ionized analyte is accelerated;
16 (e) means for applying an accelerating electrical potential to the desorbed,
17 ionized analyte; wherein the mass spectrometer is a time-of-flight mass
18 spectrometer; and
19 (f) vacuum means for applying a vacuum to the interior of the tube.

1 64. The probe of claim 63, wherein the sample presenting surface does not
2 have additional matrix molecules.

1 65 (new): The apparatus of claim 63, wherein the detector comprises an electron
2 multiplier.

1 66 (new): The apparatus of claim 63, wherein the energy source is energy from a
2 nitrogen laser or an Nd-YAG laser.

1 67 (new): The apparatus of claim 63, wherein the energy absorbing molecules
2 are noncovalently bound to the sample presenting surface.

1 68 (new): The apparatus of claim 63, wherein the energy absorbing molecules
2 are covalently bound to the sample presenting surface.

1 69 (new): The apparatus of claim 63, wherein the energy absorbing molecules
2 are selected from the group consisting of dimethoxy hydroxycinnamic acid, cinnamamide,
3 cinnamyl bromide, dihydroxybenzoic acid, and cyanohydroxycinnamic acid.

1 70. (new): The apparatus of claim 63, wherein the affinity reagent is
2 noncovalently bound to the sample presenting surface.

1 71. (new): The apparatus of claim 63, wherein the affinity reagent is covalently
2 bound to the sample presenting surface.

1 72. (new): The apparatus of claim 63, wherein the affinity reagent is selected
2 from the group consisting of a metal ion, a protein, a peptide, a nucleic acid and a dye.

1 73. (new): The apparatus of claim 72, wherein the affinity reagent comprises a
2 metal ion.

1 74. (new): The apparatus of claim 73, wherein the metal ion is selected from
2 copper or iron.

1 75. (new): The apparatus of claim 72, wherein the affinity reagent comprises a
2 protein or peptide.

1 76 (new): The apparatus of claim 75, wherein the protein or peptide is an
2 immunoglobulin.

1 77 (new): The apparatus of claim 72, wherein the affinity reagent comprises a
2 nucleic acid.

1 78 (new): The apparatus of claim 77, wherein the nucleic acid is DNA.

1 79 (new): The apparatus of claim 63, wherein the analyte comprises a protein.

1 80 (new): The apparatus of claim 63, wherein the analyte comprises a nucleic
2 acid.

1 81 (new): The apparatus of claim 80, wherein the nucleic acid is DNA.